

WHAT IS CLAIMED IS:

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1. A regeneration system comprising:
 - at least two microwave sources for producing microwaves;
 - a microwave cavity in communication with the microwave sources to receive the microwaves; and
 - a particulate filter disposed in the cavity which is heated by the microwaves in the cavity.
 2. A regeneration system as described in Claim 1 wherein the microwave cavity has multiple ports through which microwaves enter the microwave cavity.
 3. A regeneration system as described in Claim 2 wherein the microwaves are fed through either waveguides or coaxial cables with wave launchers or electric or magnetic probes into the microwave cavity.
 4. A regeneration system as described in Claim 2 wherein the microwave sources are protected by means for preventing reflected microwaves from reaching them.
 5. A regeneration system as described in Claim 4 wherein the preventing means includes isolators or circulators or the particulate filter itself.
 6. A regeneration system as described in Claim 2 including acoustic isolation for protecting the microwave sources from vibration damage.

7. A regeneration system as described in Claim 2 including means for protecting the microwave sources from exhaust and an engine for producing the exhaust connected to the cavity.

8. A regeneration system as described in Claim 7 wherein the exhaust protecting means includes windows disposed between the cavity and the microwave sources.

9. A regeneration system as described in Claim 2 including control means for turning the microwave sources on or off at desired intervals and in any desired sequence.

10. A regeneration system as described in Claim 2 including means for optimizing coupling of the microwaves from the microwave sources to the cavity and the filter.

11. A regeneration system as described in Claim 10 wherein the optimizing means includes 3-stub or iris tuners.

12. A regeneration system as described in Claim 2 including diagnostics are used to monitor the filter.

13. A regeneration system as described in Claim 12 wherein the diagnostics include thermocouples, optical pyrometers or imagers.

14. A regeneration system comprising:

at least one microwave source for producing microwaves;

a microwave cavity having a plurality of ports through which microwaves from the microwave source enter the cavity; and

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a particulate filter disposed in the cavity which is heated by the microwaves.

15. A method for regenerating a particulate filter comprising the steps of:

passing exhaust through the particulate filter; and

heating the particulate filter from a plurality of directions with microwaves.

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